

High Power High Thrust Ion Thruster (HPHTion): 50 CM Ion Thruster for Near-Earth Applications, Phase I

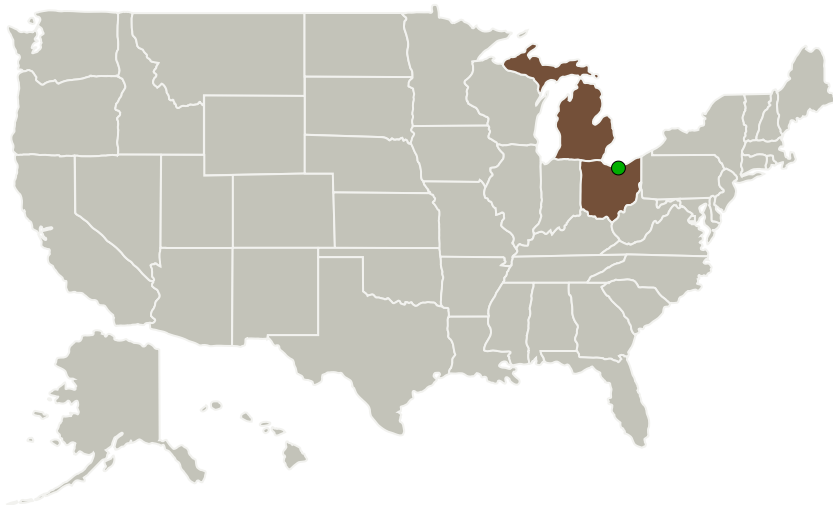
Completed Technology Project (2010 - 2011)



Project Introduction

Advances in high power, photovoltaic technology has enabled the possibility of reasonably sized, high specific power, high power, solar arrays. New thin film solar arrays have demonstrated specific powers of over 4000 W/kg (exceeding the current SOA of ~130 W/kg). At high specific powers, power levels ranging from 50 to several hundred kW are feasible for communication satellites. Coupled with gridded ion thruster technology, this power technology can be mission enabling for a wide range of missions ranging from ambitious near Earth NASA missions to those missions involving other customers as well such as DOD and commercial satellite interests. The appeal of the ion thrusters stems from their overall high efficiency, typically >70%. At present, the most advanced and mature gridded ion thruster technology is that embodied in the 7-kW NEXT ion thruster. The proposed Phase I effort seeks to design and fabricate a ion thruster discharge chamber with an equivalent beam area of a 50-cm-diameter cylindrical ion thruster with the capacity to fill the 7 to 25-kW void that currently exist for ion thrusters. The overall effort (Phases I and II) will advance the TRL level of the discharge chamber for the 50-cm thruster by understanding and optimizing the discharge chamber.

Primary U.S. Work Locations and Key Partners



High Power High Thrust Ion Thruster (HPHTion): 50 CM Ion Thruster for Near-Earth Applications, Phase I

Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Technology Areas	3
Target Destinations	3

High Power High Thrust Ion Thruster (HPHTion): 50 CM Ion Thruster for Near-Earth Applications, Phase I

Completed Technology Project (2010 - 2011)



Organizations Performing Work	Role	Type	Location
ElectroDynamic Applications, Inc.	Lead Organization	Industry Minority-Owned Business	Ann Arbor, Michigan
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio
University of Michigan-Ann Arbor	Supporting Organization	Academia	Ann Arbor, Michigan

Primary U.S. Work Locations

Michigan

Ohio

Project Transitions

**January 2010:** Project Start**January 2011:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/140136>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

ElectroDynamic Applications, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

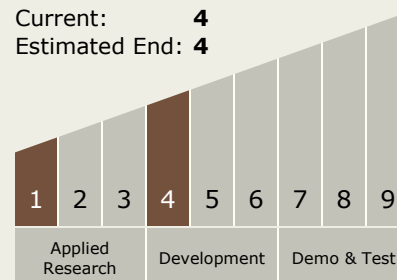
Program Manager:

Carlos Torrez

Principal Investigator:

Peter Peterson

Technology Maturity (TRL)

Start: **1**Current: **4**Estimated End: **4**

High Power High Thrust Ion Thruster (HPHTion): 50 CM Ion Thruster for Near-Earth Applications, Phase I

Completed Technology Project (2010 - 2011)



Technology Areas

Primary:

- TX01 Propulsion Systems
 - └ TX01.2 Electric Space Propulsion
 - └ TX01.2.2 Electrostatic

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System